

Chapter 3.2 INDIVIDUAL RIVER BASIN DESCRIPTION and ASSESSMENTS

Potomac and Shenandoah River Basin

The Potomac-Shenandoah River Basin, as its name implies, is made up of the Shenandoah River Subbasin and the Potomac River Subbasin. It occupies the northern portion of Virginia and covers 5,747 square miles or 14 percent of the Commonwealth's total area.

In Virginia, the Potomac-Shenandoah basin is defined by both hydrologic and political boundaries. The James River, Rappahannock River, and York River Basins bound the basin to the west and south. The West Virginia and Maryland State lines and the District of Columbia bound the northern and eastern perimeter of the basin.

The Shenandoah River Subbasin headwaters begin in Augusta County and flow in a northeasterly direction for approximately 100 miles to the West Virginia State line. The basin averages 30 miles in width and covers 2,926 square miles.

The topography of the Shenandoah River Subbasin is characterized by rolling hills and valleys bordered by the Appalachian Mountains to the west and the Blue Ridge Mountains to the east. The Massanutten Mountain Range divides the Shenandoah River into the North and South Forks. Tributaries of the Shenandoah River exhibit steep profiles as they drain the surrounding mountain ridge. The main stems of the Shenandoah exhibit a moderately sloping profile with occasional riffles and pools. 45 percent of the land is forested due to the large amount of federally owned land and the steep topography. Farmland and pasture account for 39 percent of the land area, while 16 percent is urban.

The Potomac River Subbasin headwaters begin in Highland County. The drainage area is 323 square miles for the headwaters. The river then flows in a northeasterly direction through West Virginia and Maryland before joining the Shenandoah at Harper's Ferry, West Virginia. The Potomac continues as the border between Maryland and Virginia. These waters flow in a southeasterly direction through Loudoun and Fauquier Counties to eventually less than one mile in Westmoreland County. Approximately 2,821 of the 14,700 square miles of the Potomac River Subbasin drainage area lie in Virginia. The rest covers four states and the District of Columbia.

Gently sloping hills and valleys from Harpers Ferry to approximately 45 miles down river characterize the topography of the upper Piedmont region of the Potomac River Subbasin. In the central Piedmont area, the profile is rather flat until it nears the fall line at Great Falls, where the stream elevation rapidly descends from over 200 feet, to sea level. Tributaries in the central Piedmont exhibit moderate and near constant profiles. Their flat slope largely characterizes streams in the Coastal Plain area. Approximately 40 percent of the Potomac River Basin is forested, 33 percent is farmland and pasture and an estimated 27 percent is urban.

The 2000 population for the Potomac-Shenandoah River Basin was approximately 2,347,763. The majority of the population resides in urban Virginia surrounding Washington, D.C. All or part of the following jurisdictions lie within the basin: counties – Augusta, Clarke, Frederick, Page, Rockingham, Shenandoah, Stafford, Warren, Highland, Arlington, Fairfax, Loudoun, Prince William, King George, Northumberland, and Westmoreland; cities – Alexandria, Fairfax, Falls Church, Harrisonburg, Staunton, Waynesboro, and Winchester.

Citizen-Generated Water Quality Monitoring Data in the Potomac-Shenandoah River Basin

The Potomac-Shenandoah River Basin has a number of active citizen monitoring organizations collecting and analyzing both ambient and benthic macroinvertebrate data. The organizations described in this section submitted data where one or more parameters were collected using documented protocols, standard operating procedures, and quality assurance/quality control procedures approved by the Department of Environmental Quality (DEQ) for water quality assessment purposes.

The Alliance for the Chesapeake Bay (ACB) coordinates with several affiliate organizations in the Potomac River Subbasin to monitor a conventional suite of ambient parameters including dissolved oxygen, temperature, pH, salinity and water clarity. ACB also coordinates monitoring at selected sites for a suite of parameters (including nutrients, water clarity, total suspended solids and chlorophyll a) related

to submerged aquatic vegetation (SAV). Affiliate organizations in this subbasin include Caledon Natural Area, George Washington's Birthplace Monument, Leesylvania State Park, Mason Neck State Park, Tidewater Resource Conservation and Development Council, and Westmoreland State Park. Trained volunteers monitored 20 stations and conducted 1,260 sampling events in the Potomac River Subbasin during the five-year data window for this report. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Audubon Naturalist Society (ANS) monitors benthic macroinvertebrates in the Potomac River Subbasin using the ANS protocol. Trained ANS volunteers monitored 19 stations in the Potomac Subbasin with 248 sampling events for benthic macroinvertebrates during the data window for this report. These data were used in this assessment to indicate areas needing follow-up monitoring.

The Loudoun Wildlife Conservancy (LWC) monitors benthic macroinvertebrates using the Audubon Naturalist Society protocol in Loudoun County located in the Potomac River Subbasin. Trained LWC volunteers monitored 16 stations during 159 sampling events for benthic macroinvertebrates. These data were used in this assessment to indicate areas needing follow-up monitoring.

The North Fork Goose Creek Watershed Committee monitors a conventional suite of ambient parameters including dissolved oxygen, temperature, pH, and nutrients in the Potomac River Subbasin. Trained volunteers monitored 9 stations during 247 sampling events. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Virginia Save Our Streams Program of the Virginia Division of the Izaak Walton League of America (VA SOS) coordinates with a number of affiliate organizations in the Potomac-Shenandoah River Basin to monitor benthic macroinvertebrates. Affiliate organizations in this basin include Friends of the North Fork of the Shenandoah River, Friends of the North River, Friends of Page Valley, Middle River Monitors, Northern Virginia Soil and Water Conservation District, North Fork Goose Creek Watershed Committee, Reston Association, and the Warren County Chapter of the IWLA. Certified VA SOS volunteers sampled 138 stations (97 in the Potomac River Subbasin and 41 in the Shenandoah River Subbasin) during 477 sampling events for benthic macroinvertebrates. These data were used in this assessment to indicate areas needing follow-up monitoring.

The Potomac-Shenandoah River Basin is divided into eight USGS hydrologic units as follows: HUC 02070001- South Branch Potomac; HUC 02070004-Conococheague-Opequon; HUC 02070005-South Fork Shenandoah; HUC 02070006- North Fork Shenandoah; HUC 02070007- Shenandoah; HUC 02070011- Lower Potomac. The eight hydrologic units are further divided into 87 waterbodies or watersheds.

Basin assessment information is included in Tables 3.2-1-1, 3.2-1-2, 3.2-1-3.

Table 3.2-1-1

POTOMAC-SHENANDOAH RIVER BASIN INDIVIDUAL USE SUPPORT SUMMARY TABLE

Basin Size: All Sizes Rounded to Nearest Whole Number

Rivers - 5,890 miles

Lakes - 3,731 acres

Estuaries - 68 sq.miles

Designated Use	Water Body Type	Fully Supporting	Total Impaired	Naturally Impaired	Insufficient Information	Not Assessed	Total Assessed
Aquatic Life	River (mi)	1,224	775	91	208	3,682	1,999
	Lakes (acres)	22	2,002	1,875	0	1,707	2,024
	Estuary (sq. mi.)	25	7	1	2	34	32
Fishing	River (mi)	221	200	0	0	5,469	421
	Lakes (acres)	0	0	0	0	3,731	0
	Estuary (sq. mi.)	1	28	0	0	39	29
Shellfishing	River (mi)	-	-	-	-	-	-
	Lakes (acres)	-	-	-	-	-	-
	Estuary (sq. mi.)	26	7	0	0	33	33
Swimming	River (mi)	541	1,117	0	119	4,113	1,658
	Lakes (acres)	302	0	0	0	3,429	302
	Estuary (sq. mi.)	15	3	0	0	49	18
Public Water Supply	River (mi)	223	2	0	0	1,884	225
	Lakes (acres)	1,846	0	0	0	1,321	1,846
	Estuary (sq. mi.)	-	-	-	-	-	-
Wildlife	River (mi)	1,732	0	0	3	4,155	1,732
	Lakes (acres)	323	0	0	0	3,407	323
	Estuary (sq. mi.)	25	2	1	0	41	27

TABLE 3.2-1-2

**WATERS NOT MEETING DESIGNATED USE BY VARIOUS CAUSE
CATEGORIES IN POTOMAC-SHENANDOAH BASIN**

Cause of Not Meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
General Standards (Benthics)	River (mi)	532
	Lakes (acres)	0
	Estuary (sq. mi.)	0
PCB's	River (mi)	76
	Lakes (acres)	0
	Estuary (sq. mi.)	28
pH	River (mi)	187
	Lakes (acres)	91
	Estuary (sq. mi.)	3
Ammonia	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	1
Organic Enrichment/Low D.O.	River (mi)	12
	Lakes (acres)	1,911
	Estuary (sq. mi.)	3
Temperature	River (mi)	136
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Fecal Coliform Pathogen Indicator	River (mi)	1,087
	Lakes (acres)	0
	Estuary (sq. mi.)	10
Escherichia coli Pathogen Indicator	River (mi)	244
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Enterococcus Pathogen Indicator	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	0
PCB's	River (mi)	76
	Lakes (acres)	0
	Estuary (sq. mi.)	28
Benzo(k)fluoranthene	River (mi)	8
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Nitrate	River (mi)	2
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Mercury	River (mi)	135
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Chloride	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	1

TABLE 3.2-1-3 WATERS NOT MEETING DESIGNATED USE BY VARIOUS SOURCE CATEGORIES IN POTOMAC-SHENANDOAH BASIN

Source of Not meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
Industrial Point Sources	River (mi)	1
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Municipal Point Sources	River (mi)	5
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Atmospheric Deposition – Acidity	River (mi)	151
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Changes in Ordinary Stratification and Bottom Waters Hypoxia/Anoxia	River (mi)	0
	Lakes (acres)	36
	Estuary (sq. mi.)	2
Channelization	River (mi)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Urbanized High Density Area	River (mi)	72
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Commercial Districts (Industrial Parks)	River (mi)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Contaminated Sediments	River (mi)	112
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Grazing in Riparian or Shoreline Zones	River (mi)	48
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Livestock (Grazing or Feeding Operations)	River (mi)	72
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Natural Sources	River (mi)	1
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Non-Point Source	River (mi)	596
	Lakes (acres)	36
	Estuary (sq. mi.)	0
Wastes from Pets	River (mi)	14
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Waterfowl	River (mi)	38
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Wildlife other than Waterfowl	River (mi)	737
	Lakes (acres)	0
	Estuary (sq. mi.)	0
On-site Treatment Systems (Septic Systems)	River (mi)	78
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Source Unknown	River (mi)	540
	Lakes (acres)	91
	Estuary (sq. mi.)	34
Drought Related Impacts	River (mi)	7
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Natural Conditions-Water Quality Use Attainability	River (mi)	191
	Lakes (acres)	1,875
	Estuary (sq. mi.)	0
Illicit Connections/Hookups to Storm Sewers	River (mi)	14
	Lakes (acres)	0
	Estuary (sq. mi.)	0

James River Basin

The James River Basin occupies the central portion of Virginia and covers 10,206 square miles or approximately 25 percent of the Commonwealth's total land area. It is Virginia's largest river basin and is made up of the Upper, Middle, and Lower James River Subbasin and the Appomattox River Subbasin.

The James River Basin is defined by both hydrologic and political boundaries. The Potomac-Shenandoah River Basin, the Rappahannock River Basin and the York River Basins bound the basin to the north. The southern boundary is made up of the New River Basin, the Roanoke River Basin and the Chowan River Basin. Its headwaters originate along the Virginia/West Virginia state line.

The James River Basin begins in the Alleghany Mountains and flows in a southeasterly direction to Hampton Roads where it enters the Chesapeake Bay. The James is formed by the confluence of the Jackson and Cowpasture Rivers and flows 228 miles to the Fall Line at Richmond and another 111 miles to the Chesapeake Bay.

The topography of the James River Basin varies throughout the four physiographic provinces that it spans. The Valley and Ridge Province extends from the Appalachian Plateau in West Virginia to the Blue Ridge Province. This province is dominated by narrow ridges and valleys running in a northeast/southwest direction, turning into a broad valley with low, rounded hills in the extreme southeast section of the province. The Blue Ridge Province, a remnant of a former highland, differs from the Valley and Ridge Province to the Fall Line. The western section of the Piedmont has scattered hills and small mountains, gradually turning into gently rolling slopes and lower elevation in the eastern Piedmont Province. The Fall Zone separates the Coastal Plain Province from the Piedmont. The Fall Zone is a three-mile stretch of river running through Richmond where the river descends 84 feet as it flows from the resistant rocks of the Piedmont to the softer sediments of the Coastal Plain.

Over 65 percent of the James River Basin is forested, with 19 percent in cropland and pasture. Approximately 12 percent is considered urban. The 2000 population for the James River Basin was approximately 2,180,856. This population is concentrated in two metropolitan areas: Tidewater, with over one million people, and the Greater Richmond – Petersburg area with over 750,000. Two smaller population centers are the Lynchburg and Charlottesville areas, each with over 100,000 people. All or portions of the following 38 counties and 14 cities lie within the basin: counties - Alleghany, Amherst, Bath, Nelson, Rockbridge, Augusta, Bedford, Botetourt, Campbell, Craig, Giles, Highland, Montgomery, Roanoke, Amelia, Buckingham, Chesterfield, Cumberland, Fluvanna, Goochland, Henrico, Powhatan, Albemarle, Appomattox, Prince Edward, Dinwiddie, Greene, Hanover, Louisa, Nottoway, Orange, Charles City, Isle of Wight, James City, New Kent, Prince George, Surry, and York; cities - Buena Vista, Clifton Forge, Covington, Lexington, Lynchburg, Charlottesville, Colonial Heights, Petersburg, Richmond, Hopewell, Norfolk, Newport News, Suffolk, and Williamsburg.

Average annual precipitation is 42.5 inches. Average annual snowfall amount ranges from over 30 inches in the mountains to less than 10 inches along the coast.

Major tributaries to the James River are Jackson River, Cowpasture River, Craig Creek, Maury River, Tye River, Rockfish River, Slate River, Rivanna River, Willis Creek, Appomattox River, Chichahominy River, Pagan River, Nansemond River, and the Elizabeth River.

Citizen-Generated Water Quality Monitoring Data in the James River Basin

The James River Basin has a number of active citizen monitoring organizations collecting and analyzing both ambient and benthic macroinvertebrate data. The organizations described in this section submitted data where one or more parameters were collected using documented protocols, standard operating procedures, and quality assurance/quality control procedures approved by the Department of Environmental Quality (DEQ) for water quality assessment purposes.

The Alliance for the Chesapeake Bay (ACB) coordinates with a number of affiliate organizations in the James River Basin to monitor a conventional suite of ambient parameters including dissolved oxygen, temperature, pH, salinity and water clarity. ACB also coordinates monitoring at selected sites for a suite of parameters (including nutrients, water clarity, total suspended solids and chlorophyll a) related

to submerged aquatic vegetation (SAV). Affiliate organizations in this basin include Cherokee Lake Association, Chesapeake Bay Youth Conservation Corps, Chippokes State Park, Elizabeth River Project, Friends of Chesterfield's Riverfront, Friends of Scott's Creek, James River Association, and James River Park. Trained volunteers monitored 42 stations and conducted 2,260 sampling events in the James River Basin during the five-year data window for this report. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Appomattox River Water Quality Monitoring Program (coordinated by Clean Virginia Waterways and Longwood University) monitors a conventional suite of ambient parameters including dissolved oxygen, temperature, pH, nutrients, water clarity, and fecal coliform bacteria in the Appomattox River Subbasin of the James River Basin. Trained volunteers monitored 33 stations during 398 sampling events in this basin. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Virginia Save Our Streams Program of the Virginia Division of the Izaak Walton League of America (VA SOS) coordinates with a number of affiliate organizations in the James River Basin to monitor benthic macroinvertebrates. Affiliate organizations in this basin include Amelia County Landfill, Buckingham Citizen Action League, Cowpasture River Preservation Association, Douthat State Park, Environmentally Concerned Citizens Organization, Environmental Education Center, Friends of the Pedlar River, Friends of the Rockfish River, Maury River Middle School, Maury River Monitors, Mountain Stream Stewards, Pedlar River Institute, Piedmont Environmental Council, Rivanna Conservation Society, Rivanna River Basin Project, the Skyline Chapter of Trout Unlimited, and StreamWatch. Certified VA SOS volunteers sampled 97 stations in the James River Basin during 331 sampling events for benthic macroinvertebrates. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The James River Basin is divided into seven USGS hydrologic units as follows: HUC 02080201 – Upper James, HUC 02080202 – the Maury, HUC 02080203 – Upper Middle James, HUC 02080204 – the Rivanna, HUC 02080205 – the Lower middle James, HUC 02080206 – Lower James, and HUC 02080207 – the Appomattox, and HUC 02080208 – the Elizabeth. The nine hydrologic units are further divided into 92 waterbodies or watersheds.

Basin assessment information is presented in Tables 3.2-2-1, 3.2-2-2, 3.2-2-3.

TABLE 3.2-2-1

JAMES RIVER BASIN INDIVIDUAL USE SUPPORT SUMMARY TABLE

Basin Size: All Sizes Rounded to Nearest Whole Number

Rivers - 12,960 miles

Lakes - 19,405 acres

Estuaries - 259 sq. miles

Designated Use	Water Body Type	Fully Supporting	Total Impaired	Naturally Impaired	Insufficient Information	Not Assessed	Total Assessed
Aquatic Life	River (mi)	2,458	493	169	235	9,774	2,951
	Lakes (acres)	3,030	11,789	3,140	110	4,476	14,819
	Estuary (sq. mi.)	22	222	15	1	14	244
Fishing	River (mi)	891	22	0	97	11,950	913
	Lakes (acres)	8,372	0	0	0	11,033	8,372
	Estuary (sq. mi.)	169	62	0	3	25	231
Shellfishing	River (mi)	-	-	-	-	-	-
	Lakes (acres)	-	-	-	-	-	-
	Estuary (sq. mi.)	97	17	0	0	0	114
Swimming	River (mi)	1,041	1,135	0	343	10,441	2,176
	Lakes (acres)	13,849	0	0	0	5,556	13,849
	Estuary (sq. mi.)	212	31	0	0	16	243
Public Water Supply	River (mi)	415	17	7	0	1,413	432
	Lakes (acres)	13,142	110	0	0	1,442	13,252
	Estuary (sq. mi.)	9	0	0	0	0	9
Wildlife	River (mi)	2,271	0	0	96	10,593	2,271
	Lakes (acres)	13,739	230	0	0	5,436	16,951
	Estuary (sq. mi.)	224	19	19	0	15	243

TABLE 3.2-2-2

**WATERS NOT MEETING DESIGNATED USE BY VARIOUS CAUSE
CATEGORIES IN JAMES BASIN**

Cause of Not Meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
General Standards (Benthics)	River (mi)	126
	Lakes (acres)	0
	Estuary (sq. mi.)	151
Aldrin	River (mi)	7
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Chloride	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	19
Copper	River (mi)	0
	Lakes (acres)	230
	Estuary (sq. mi.)	0
Manganese	River (mi)	7
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Iron	River (mi)	7
	Lakes (acres)	0
	Estuary (sq. mi.)	0
pH	River (mi)	193
	Lakes (acres)	157
	Estuary (sq. mi.)	2
Nutrient/Eutrophication Biological Indicators	River (mi)	0
	Lakes (acres)	110
	Estuary (sq. mi.)	210
Organic Enrichment/Low D.O.	River (mi)	228
	Lakes (acres)	11,699
	Estuary (sq. mi.)	3
Temperature	River (mi)	40
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Fecal Coliform Pathogen Indicators	River (mi)	1,125
	Lakes (acres)	0
	Estuary (sq. mi.)	44
Escherichia coli Pathogen Indicators	River (mi)	45
	Lakes (acres)	0
	Estuary (sq. mi.)	2
Enterococcus Pathogen Indicators	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	3
Sulfates	River (mi)	10
	Lakes (acres)	0
	Estuary (sq. mi.)	0
PCB's	River (mi)	22
	Lakes (acres)	0
	Estuary (sq. mi.)	62
Tributyltin (TBT)	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	15

TABLE 3.2-2-3 WATERS NOT MEETING DESIGNATED USE BY VARIOUS SOURCE CATEGORIES IN JAMES BASIN

Source of Not meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
Industrial Point Sources	River (mi)	49
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Municipal Point Sources	River (mi)	50
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Urbanized High Density Area	River (mi)	68
	Lakes (acres)	230
	Estuary (sq. mi.)	0
Combined Sewer Overflow	River (mi)	38
	Lakes (acres)	0
	Estuary (sq. mi.)	11
Agriculture	River (mi)	7
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Atmospheric Deposition – Acidity	River (mi)	5
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Shipbuilding/Drydock and Ship Repairs	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	15
Changes in Ordinary Stratification and Bottom Water Anoxia	River (mi)	2
	Lakes (acres)	3,723
	Estuary (sq. mi.)	0
Discharges from Municipal Separate Storm Sewers	River (mi)	35
	Lakes (acres)	0
	Estuary (sq. mi.)	6
Upstream Impoundment (PI-566 NRCS Structures)	River (mi)	1
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Natural Conditions – Water Quality Use Attainability	River (mi)	207
	Lakes (acres)	3,257
	Estuary (sq. mi.)	19
Non-Point Source	River (mi)	542
	Lakes (acres)	216
	Estuary (sq. mi.)	13
Wildlife other than Waterfowl	River (mi)	284
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Upstream Source	River (mi)	20
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Landfills	River (mi)	2
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Source Unknown	River (mi)	793
	Lakes (acres)	5,076
	Estuary (sq. mi.)	220
Drought Related Impacts	River (mi)	7
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Mine Tailings	River (mi)	6
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Dam or Impoundment	River (mi)	12
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Grazing in Riparian or Shoreline Zones	River (mi)	37
	Lakes (acres)	0
	Estuary (sq. mi.)	0

Rappahannock River Basin

The Rappahannock River Basin is located in the northeastern portion of Virginia and covers 2,715 square miles or approximately 6.8 percent of the Commonwealth's total area.

The Rappahannock River Basin is bordered by the Potomac-Shenandoah Basin to the north and the York River Basin and Coastal Basin to the south. The headwaters lie in Fauquier and Rappahannock Counties and flow in a southeasterly direction to its mouth, where it enters the Chesapeake Bay between Lancaster and Middlesex Counties. The Rappahannock River Basin is 184 miles in length and varies in width from 20 to 50 miles. The Rappahannock River Basin's major tributaries are the Hazel River, Thornton River, Mountain Run, Rapidan River, Robinson River, Cat Point Creek, and the Corotoman River.

The topography of the Rappahannock River Basin changes from steep to flat as it flows from the Blue Ridge Mountains to the Chesapeake Bay. About 51 percent of the basin land is forest, while pasture and cropland make up another 36 percent. Only about 6 percent of the land area is considered urban.

Most of the Rappahannock River Basin lies in the eastern Piedmont and Tidewater areas of the Commonwealth while its headwaters, located on the eastern slopes of the Blue Ridge, are considered to be in the northern and western Piedmont section.

The 2000 population of the Rappahannock River Basin was approximately 241,602. The basin is mostly rural in character with no large population centers. However, the influence of metropolitan Washington is beginning to be felt in the Fredericksburg and Fauquier areas of the basin. All or portions of the following 18 counties lie within the Basin: Albemarle, Caroline, Culpeper, Essex, Fauquier, Gloucester, Greene, King and Queen, King George, Lancaster, Madison, Middlesex, Orange, Rappahannock, Richmond, Spotsylvania, Stafford, and Westmoreland.

Citizen-Generated Water Quality Monitoring Data in the Rappahannock River Basin

The Rappahannock River Basin has a number of active citizen monitoring organizations collecting and analyzing both ambient and benthic macroinvertebrate data. The organizations described in this section submitted data where one or more parameters were collected using documented protocols, standard operating procedures, and quality assurance/quality control procedures approved by the Department of Environmental Quality (DEQ) for water quality assessment purposes.

The Alliance for the Chesapeake Bay (ACB) coordinates with several affiliate organizations in the Rappahannock River Basin to monitor a conventional suite of ambient parameters including dissolved oxygen, temperature, pH, salinity and water clarity. Affiliate organizations in this basin include Cat Point Creek Group, Friends of the Rappahannock, and the Tidewater Resource Conservation and Development Council. Trained volunteers conducted 1,263 sampling events at 13 stations in the Rappahannock River Basin during the 5-year data window for this report. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Virginia Save Our Streams Program of the Virginia Division of the Izaak Walton League of America (VA SOS) coordinates with several affiliate organizations in the Rappahannock River Basin to monitor benthic macroinvertebrates. Affiliate organizations in this basin include Friends of the Rappahannock and the Upper Rappahannock Watershed Stream Monitoring Program (coordinated by the Culpeper and John Marshall Soil and Water Conservation Districts). Certified VA SOS volunteers sampled 84 stations in the Rappahannock River Basin during 345 sampling events for benthic macroinvertebrates. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Upper Rappahannock Watershed Stream Monitoring Program monitors a conventional suite of ambient parameters including dissolved oxygen, temperature, pH, fecal coliform bacteria, nutrients, and solids in this river basin. Trained volunteers conducted 136 sampling events at 31 stations in this basin. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Rappahannock River Basin is divided into two USGS hydrologic units as follows: HUC 02080103 – Rapidan – Upper Rappahannock; and HUC 02080104 – Lower Rappahannock.

Basin assessment information is presented in Tables 3.2-3-1, 3.2-3-2, 3.2-3-3.

TABLE 3.2-3-1 RAPPAHANNOCK RIVER BASIN INDIVIDUAL USE SUPPORT SUMMARY TABLE

Basin Size: All Sizes Rounded to Nearest Whole Number

Rivers - 2,806 miles

Lakes - 488 acres

Estuaries - 167 sq. miles

Designated Use	Water Body Type	Fully Supporting	Total Impaired	Naturally Impaired	Insufficient Information	Not Assessed	Total Assessed
Aquatic Life	River (mi)	368	114	104	137	2,187	482
	Lakes (acres)	0	328	328	0	160	328
	Estuary (sq. mi.)	12	145	12	2	8	157
Fishing	River (mi)	78	0	0	0	2,729	78
	Lakes (acres)	0	0	0	0	488	0
	Estuary (sq. mi.)	92	5	0	0	69	97
Shellfishing	River (mi)	-	-	-	-	-	-
	Lakes (acres)	-	-	-	-	-	-
	Estuary (sq. mi.)	126	11	0	0	10	137
Swimming	River (mi)	115	204	0	23	2,464	319
	Lakes (acres)	328	0	0	0	160	328
	Estuary (sq. mi.)	134	8	0	0	25	142
Public Water Supply	River (mi)	25	0	0	0	635	25
	Lakes (acres)	328	0	0	0	160	328
	Estuary (sq. mi.)	-	-	-	-	-	-
Wildlife	River (mi)	316	0	0	0	2,491	316
	Lakes (acres)	328	0	0	0	160	328
	Estuary (sq. mi.)	86	67	66	0	12	153

TABLE 3.2-3-2

**WATERS NOT MEETING DESIGNATED USE BY VARIOUS CAUSE
CATEGORIES IN RAPPAHANNOCK BASIN**

Cause of Not Meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
Chloride	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	67
Nutrient/Eutrophication Biological Indicators	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	4
pH	River (mi)	109
	Lakes (acres)	253
	Estuary (sq. mi.)	1
Organic Enrichment/Low D.O.	River (mi)	3
	Lakes (acres)	328
	Estuary (sq. mi.)	129
Fecal Coliform Pathogen Indicators	River (mi)	196
	Lakes (acres)	0
	Estuary (sq. mi.)	16
E. coli Pathogen Indicators	River (mi)	21
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Enterococcus Pathogen Indicators	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Temperature	River (mi)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	0
PCB's	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	5

TABLE 3.2-3-2 WATERS NOT MEETING DESIGNATED USE BY VARIOUS SOURCE CATEGORIES IN RAPPAHANNOCK BASIN

Source of Not meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
Changes in Ordinary Stratification and Bottom Water Hypoxia/Anoxia	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	129
Municipal Point Sources	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	1
Natural Conditions – Water Quality Use Attainability	River (mi)	104
	Lakes (acres)	328
	Estuary (sq. mi.)	67
Livestock Grazing Operations	River (mi)	23
	Lakes (acres)	0
	Estuary (sq. mi.)	0
On-site Treatment Systems (Septic)	River (mi)	23
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Source Unknown	River (mi)	169
	Lakes (acres)	0
	Estuary (sq. mi.)	21
Wildlife other than Waterfowl	River (mi)	23
	Lakes (acres)	0
	Estuary (sq. mi.)	0

Roanoke River Basin

The Roanoke River Basin covers 6,382 square miles or approximately 16 percent of the Commonwealth's total area. In addition to the Roanoke itself, the basin also contains the Ararat River Subbasin.

The Virginia portion of the Roanoke River Basin is defined by both hydrologic and political boundaries. The James River Basin, on the east bound the basin to the north by the Chowan River Basin, and to the west by the New River Basin. The southern boundary of the basin is the Virginia/North Carolina State line.

The topography of the Roanoke River Basin ranges from steep slopes and valleys in the Valley and Ridge Province to gently sloping terrain east of the mountains in the Piedmont Province.

The Roanoke River Basin headwaters begin in the mountainous terrain of eastern Montgomery County and flow in a southeasterly direction to the Virginia/North Carolina State line. The Roanoke Basin passes through three physiographic provinces, the Valley and Ridge Province to the northwest, and the Blue Ridge and Piedmont Provinces to the southeast.

The Roanoke watershed is large enough to accommodate two major reservoirs, Smith Mountain and Leesville Lakes to the north and Kerr Reservoir and Lake Gaston located at the junction of the Roanoke River and the North Carolina state line. These reservoirs range in size from the 49,000 acre Kerr Reservoir to the 3,400 acre Leesville Lake. These impoundments are used for both recreation and hydroelectricity. Major tributaries in the northern section of the basin are the Little Otter and Big Otter Rivers along with the Blackwater and Pigg Rivers. Major tributaries in the southern portion include the Dan River, Smith River, and Banister River. Over 62 percent of the Roanoke River Basin is forested, while nearly 25 percent is in cropland and pasture. Approximately 10 percent is considered urban.

The 2000 population for the Roanoke River Basin was approximately 675,844. All or portions of the following sixteen counties and five cities lie within the basin: counties – Patrick, Henry, Pittsylvania, Halifax, Franklin, Mecklenburg, Roanoke, Bedford, Campbell, Charlotte, Carroll, Brunswick, Montgomery, Botetourt, Floyd, and Appomattox; cities – Roanoke, Salem, Martinsville, Danville, and Bedford.

Citizen-Generated Water Quality Monitoring Data in the Roanoke River Basin

The Roanoke River Basin has several active citizen monitoring organizations collecting and analyzing both ambient and benthic macroinvertebrate data. The organizations described in this section submitted data where one or more parameters were collected using documented protocols, standard operating procedures, and quality assurance/quality control procedures approved by the Department of Environmental Quality (DEQ) for water quality assessment purposes.

The Virginia Save Our Streams Program of the Virginia Division of the Izaak Walton League of America (VA SOS) coordinates with several affiliate organizations in the Roanoke River Basin to monitor benthic macroinvertebrates. Affiliate organizations in this basin include Elliott Creek Watershed Protection Council, Virginia's Explore Park, and the Virginia Museum of Natural History at Virginia Tech. Certified VA SOS volunteers conducted 46 sampling events for benthic macroinvertebrates at 19 stations in the Roanoke River Basin during the assessment data window. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Appomattox River Water Quality Monitoring Program monitors a conventional suite of ambient parameters including dissolved oxygen, temperature, pH, water clarity, and fecal coliform bacteria in the Roanoke River Basin. Trained volunteers monitored 5 stations during 95 sampling events in this basin. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Roanoke River Basin is divided into six USGS hydrologic units as follows: HUC 03010101 – Upper Roanoke; HUC 03010102 – Middle Roanoke; HUC 03010103 – Upper Dan; HUC 03010104 – Lower Dan; HUC 03010105 – Banister, and HUC 03010106 – Roanoke Rapids.

Basin assessment information is presented in table 3.2-4-1, 3.2-4-2, 3.2-4-3.

TABLE 3.2-4-1

ROANOKE RIVER BASIN INDIVIDUAL USE SUPPORT SUMMARY

Basin Size: All Sizes Rounded to Nearest Whole Number

Rivers - 9,387 miles

Lakes - 66,896 acres

Estuaries - 0 sq. miles

Designated Use	Water Body Type	Fully Supporting	Total Impaired	Naturally Impaired	Insufficient Information	Not Assessed	Total Assessed
Aquatic Life	River (mi)	1,272	181	0	48	7,886	1453
	Lakes (acres)	2,182	62,013	46,073	0	2,701	64,195
	Estuary (sq. mi.)	-	-	-	-	-	-
Fishing	River (mi)	270	183	0	0	8,934	453
	Lakes (acres)	10,404	43,070	0	0	13,422	53,474
	Estuary (sq. mi.)	-	-	-	-	-	-
Shellfishing	River (mi)	-	-	-	-	-	-
	Lakes (acres)	-	-	-	-	-	-
	Estuary (sq. mi.)	-	-	-	-	-	-
Swimming	River (mi)	206	1,044	0	32	8,105	1,250
	Lakes (acres)	61,161	2,691	0	0	3,046	63,852
	Estuary (sq. mi.)	-	-	-	-	-	-
Public Water Supply	River (mi)	617	0	0	0	3,893	617
	Lakes (acres)	61,495	0	0	0	2,104	61,495
	Estuary (sq. mi.)	-	-	-	-	-	-
Wildlife	River (mi)	1,251	0	0	0	8,136	1,251
	Lakes (acres)	63,845	0	0	0	3,051	63,845
	Estuary (sq. mi.)	-	-	-	-	-	-

TABLE 3.2-4-2

**WATERS NOT MEETING DESIGNATED USE BY VARIOUS CAUSE
CATEGORIES IN ROANOKE BASIN**

Cause of Not Meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
General Standards (Benthics)	River (mi)	84
	Lakes (acres)	0
	Estuary (sq. mi.)	-
DDE	River (mi)	10
	Lakes (acres)	0
	Estuary (sq. mi.)	-
DDT	River (mi)	10
	Lakes (acres)	0
	Estuary (sq. mi.)	-
PCB's	River (mi)	183
	Lakes (acres)	43,070
	Estuary (sq. mi.)	-
pH	River (mi)	0
	Lakes (acres)	8,586
	Estuary (sq. mi.)	-
Organic Enrichment/Low D.O	River (mi)	10
	Lakes (acres)	62,013
	Estuary (sq. mi.)	-
Fecal Coliform Pathogen Indicators	River (mi)	1,007
	Lakes (acres)	1,066
	Estuary (sq. mi.)	-
Escherichia coli Pathogen Indicators	River (mi)	185
	Lakes (acres)	1,810
	Estuary (sq. mi.)	-
Temperature	River (mi)	87
	Lakes (acres)	0
	Estuary (sq. mi.)	-

TABLE 3.2-4-3 WATERS NOT MEETING DESIGNATED USE BY VARIOUS SOURCE CATEGORIES IN ROANOKE BASIN

Source of Not meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
Agriculture	River (mi)	396
	Lakes (acres)	683
	Estuary (sq. mi.)	-
Changes in Ordinary Stratification and Bottom Waters Hypoxia/Anoxia	River (mi)	0
	Lakes (acres)	3,656
	Estuary (sq. mi.)	-
Dam or Impoundment	River (mi)	16
	Lakes (acres)	1,380
	Estuary (sq. mi.)	-
Discharges from Municipal Separate Storm Sewer Systems	River (mi)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Grazing in Riparian or Shoreline Zones	River (mi)	120
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Loss of Riparian Habitat	River (mi)	21
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Managed Pasture Grazing	River (mi)	14
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Urbanized High Density Area	River (mi)	255
	Lakes (acres)	378
	Estuary (sq. mi.)	-
Municipal Point Source Discharges	River (mi)	42
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Natural Conditions – Water Quality Use Attainability	River (mi)	0
	Lakes (acres)	54,659
	Estuary (sq. mi.)	-
Package Plant or Other Permitted Small Flow Discharges	River (mi)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Non-Point Source	River (mi)	355
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Sanitary Sewer Overflows	River (mi)	58
	Lakes (acres)	378
	Estuary (sq. mi.)	-
Source Unknown	River (mi)	494
	Lakes (acres)	48,383
	Estuary (sq. mi.)	-
Streambank Modification or Destabilization	River (mi)	21
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Upstream Source	River (mi)	5
	Lakes (acres)	349
	Estuary (sq. mi.)	-
Wildlife other than Waterfowl	River (mi)	482
	Lakes (acres)	683
	Estuary (sq. mi.)	-

Chowan River-Dismal Swamp Basin

The Chowan River and Dismal Swamp Basin is located in the southeastern portion of Virginia and covers 4,061 square miles or approximately 10 percent of the Commonwealth's total area.

The Basin extends eastward from Charlotte County to the Chesapeake Bay. The Chowan River-Dismal Swamp Basin in Virginia is defined by both hydrologic and political boundaries. The James River Basin and the Small Coastal River Basins to the east, the Roanoke River Basin to the west and the Virginia/North Carolina State line to the south border the basin. The basin is approximately 145 miles in length and varies from 10 to 50 miles in width. The Chowan River-Dismal Swamp Basin flows through the Piedmont and Coastal Plain Physiological Provinces. The Chowan portion flows 130 miles from east to west, crossing both the Piedmont and Coastal Plain, while the Dismal Swamp lies entirely within the Coastal Plain. The Piedmont portion is characterized by rolling hills, steeper slopes and somewhat more pronounced stream valleys. The Coastal Plain, in contrast, is nearly flat with a descending series of terraces.

The Chowan River-Dismal Swamp Basin is mostly rural with approximately 64 percent of its land covered by forest. Cropland and pasture make up another 28 percent, while only about 6 percent is classified as urban.

The 2000 population for the Chowan River-Dismal Swamp Basin was approximately 339,236. All or portions of the following 14 counties and three cities lie within the basin: counties – Greensville, Lunenburg, Southampton, Sussex, Brunswick, Charlotte, Dinwiddie, Isle of Wight, Mecklenburg, Nansemond, Nottoway, Prince Edward, and Surry; Cities – Chesapeake, Franklin, Suffolk, and Virginia Beach.

Major tributaries of the Chowan River are the Meherrin, the Nottoway and the Blackwater. The Nottoway and the Blackwater join at the Virginia/North Carolina state line to form the Chowan River. The Dismal Swamp portion is mostly flat with many swamp and marshland areas.

Citizen-Generated Water Quality Monitoring Data in the Chowan River Basin

The Virginia Save Our Streams Program of the Virginia Division of the Izaak Walton League of America (VA SOS) coordinates with the J.R. Horsley Soil and Water Conservation District in the Chowan River Basin to monitor benthic macroinvertebrates. Certified VA SOS volunteers monitored 3 stations during 9 sampling events during the 5-year data window for this report. These data were used in this assessment to indicate areas needing follow-up monitoring.

The Chowan River-Dismal Swamp Basin is divided into five USGS hydrologic units as follows: HUC 03010204 – Nottoway; HUC 03010202 – Blackwater; HUC 03010203 – Chowan; HUC 03010204 – Meherrin; and HUC 03010205 – Albemarle Sound. The five hydrologic units are further divided into 44 waterbodies or watersheds.

Basin assessment information is presented in Tables 3.2-5-1, 3.2-5-2, 3.2-5-3.

TABLE 3.2-5-1

CHOWAN-DISMAL SWAMP BASIN INDIVIDUAL USE SUPPORT SUMMARY TABLE

Basin Size: All Sizes Rounded to Nearest Whole Number

Rivers - 5,023 miles

Lakes - 4,497 acres

Estuaries - 84 sq. miles

Designated Use	Water Body Type	Fully Supporting	Total Impaired	Naturally Impaired	Insufficient Information	Not Assessed	Total Assessed
Aquatic Life	River (mi)	331	901	816	9	3,782	1,232
	Lakes (acres)	0	767	21	105	3,625	767
	Estuary (sq. mi.)	81	0	0	0	2	81
Fishing	River (mi)	94	55	0	0	4,874	149
	Lakes (acres)	210	0	0	0	4,287	210
	Estuary (sq. mi.)	0	0	0	0	84	0
Shellfishing	River (mi)	-	-	-	-	-	-
	Lakes (acres)	-	-	-	-	-	-
	Estuary (sq. mi.)	-	-	-	-	-	-
Swimming	River (mi)	508	513	0	7	3,995	1,021
	Lakes (acres)	767	0	0	0	3,730	767
	Estuary (sq. mi.)	81	0	0	0	3	81
Drinking Water	River (mi)	83	0	0	0	147	83
	Lakes (acres)	767	0	0	0	67	767
	Estuary (sq. mi.)	-	-	-	-	-	-
Wildlife	River (mi)	963	1	0	64	3,995	964
	Lakes (acres)	767	0	0	0	3,730	767
	Estuary (sq. mi.)	81	0	0	0	3	81

TABLE 3.2-5-2

**WATERS NOT MEETING DESIGNATED USE BY VARIOUS CAUSE
CATEGORIES IN CHOWAN-DISMAL SWAMP BASIN**

Cause of Not Meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
General Standards (Benthics)	River (mi)	5
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Ammonia	River (mi)	1
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Benzo(k)fluoranthene	River (mi)	6
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Chloride	River (mi)	29
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Mercury	River (mi)	49
	Lakes (acres)	0
	Estuary (sq. mi.)	0
pH	River (mi)	706
	Lakes (acres)	0
	Estuary (sq. mi.)	0
PCB's	River (mi)	6
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Organic Enrichment/Low D.O.	River (mi)	837
	Lakes (acres)	767
	Estuary (sq. mi.)	0
Fecal Coliform Pathogen Indicators	River (mi)	513
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Escherichia coli Pathogen Indicators	River (mi)	11
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Enterococcus Pathogen Indicators	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	0

TABLE 3.2-5-3

**WATERS NOT MEETING DESIGNATED USE BY VARIOUS SOURCE
CATEGORIES IN CHOWAN-DISMAL SWAMP BASIN**

Source of Not meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
Animal Feeding Operations	River (mi)	22
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Changes in Ordinary Stratification and Bottom Water Hypoxia/Anoxia	River (mi)	0
	Lakes (acres)	515
	Estuary (sq. mi.)	0
Dam or Impoundment	River (mi)	16
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Industrial Point Source Discharge	River (mi)	10
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Municipal Point source Discharges	River (mi)	5
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Natural Conditions – Water Quality Use Attainability	River (mi)	840
	Lakes (acres)	21
	Estuary (sq. mi.)	0
Source Unknown	River (mi)	580
	Lakes (acres)	231
	Estuary (sq. mi.)	0

Tennessee-Big Sandy River Basin

The segment of the Tennessee and Big Sandy River Basin, which lies in Virginia, is made up of the Holston, Clinch-Powell, and Big Sandy River Subbasins. These subbasins are located in the extreme southwest portion of Virginia and cover 4,140 square miles or approximately 10.5 percent of the Commonwealth's total land area.

The Virginia portion of the Tennessee-Big Sandy River Basin is defined by both hydrologic and political boundaries. The West Virginia State line lies to the northeast, Kentucky to the west, and Tennessee to the south. The New River Basin makes up the eastern boundary.

While numerous southwestern Virginia streams feed the Tennessee and Big Sandy Rivers, neither river forms within the Commonwealth itself. The Big Sandy Subbasin contains the Levisa and Tug Forks that flows northward into Kentucky forming the Big Sandy River. The southwestward flowing Holston, Clinch, and Powell tributaries form the Tennessee River in Tennessee. Both of the major river subbasins eventually empty into the Gulf of Mexico via the Ohio and Mississippi Rivers.

The Tennessee-Big Sandy River Basin spans three physiographic provinces: Cumberland Plateau, Valley and Ridge, and the Blue Ridge. The Big Sandy portion of the basin lies within the Cumberland Plateau. This province is characterized as rugged, with mountainous terrain and steep valleys. Parallel valleys and ridges running in a northeast to southwest direction characterize the Tennessee portion, lying in the Valley and Ridge Province. A small portion, located in the Blue Ridge Province, is more plateau-like, with no single, prominent ridge that characterizes the Ridge and Valley province to the north.

Within Virginia, approximately 48 percent of the Tennessee River Basin is forested, while cropland and pasture make up another 39.7 percent. The Big Sandy portion of the basin is approximately 86 percent forest, with only about 5 percent in cropland and pasture. Urban areas make up only a small percentage of the total land area.

The 2000 population for the Tennessee-Big Sandy River Basin was approximately 298,281. All or parts of the following jurisdictions lie within the basin: counties – Lee, Scott, Russell, Washington, Smyth, Tazewell, Buchanan, Dickinson, Bland, Wythe, Grayson, and Wise; Cities – Norton and Bristol.

Citizen-Generated Water Quality Monitoring Data in the Tennessee-Big Sandy River Basin

The Virginia Save Our Streams Program of the Virginia Division of the Izaak Walton League of America (VA SOS) coordinates with several affiliate organizations in the Tennessee-Big Sandy River Basin to monitor benthic macroinvertebrates. Affiliate organizations in this basin include the Emory and Henry College, Grundy High School Earth Science Class, Headwaters Association, Holston River Water Quality Monitors, Hungry Mother State Park, and the Kittrell Stream Team. Certified VA SOS volunteers conducted 33 sampling events at 22 stations in this river basin during the data window for this report. These data were used in this assessment to indicate areas needing follow-up monitoring.

The Tennessee-Big Sandy River Basin is divided into six USGS hydrologic units as follows: HUC 05070201 – Tug Fork; HUC 05070202 – Upper Levisa; HUC 06010101 – North Fork Holston; HUC 06010102 – South and Middle Fork Holston; HUC 06010205 – Upper Clinch; and HUC 01010206 – Powell River. The six hydrologic units are further divided into 48 waterbodies or watersheds.

Basin assessment information is presented in Tables 3.2-6-2, 3.2-6-2, 3.2-6-3.

TABLE 3.2-6-1

TENNESSEE – BIG SANDY RIVER BASIN INDIVIDUAL USE SUPPORT SUMMARY

Basin Size: All Sizes Rounded to Nearest Whole Number

Rivers - 5,926 miles

Lakes - 3,844 acres

Estuaries - 0 sq. miles

Designated Use	Water Body Type	Fully Supporting	Total Impaired	Naturally Impaired	Insufficient Information	Not Assessed	Total Assessed
Aquatic Life	River (mi)	676	340	0	92	4,818	1,016
	Lakes (acres)	0	3,541	120	0	303	3,541
	Estuary (sq. mi.)	-	-	0	-	-	-
Fishing	River (mi)	147	141	0	0	5,638	288
	Lakes (acres)	1,251	0	0	0	2,593	1,251
	Estuary (sq. mi.)	-	-	-	-	-	-
Shellfishing	River (mi)	-	-	-	-	-	-
	Lakes (acres)	-	-	-	-	-	-
	Estuary (sq. mi.)	-	-	-	-	-	-
Swimming	River (mi)	150	431	0	69	5,276	581
	Lakes (acres)	1,916	0	0	108	1,820	1,916
	Estuary (sq. mi.)	-	-	-	-	-	-
Public Water Supply	River (mi)	0	0	0	0	278	0
	Lakes (acres)	1,143	0	0	0	2,200	1,143
	Estuary (sq. mi.)	-	-	-	-	-	-
Wildlife	River (mi)	456	0	0	3	5,468	456
	Lakes (acres)	2,178	0	0	0	1,666	2,178
	Estuary (sq. mi.)	-	-	-	-	-	-

TABLE 3.2-6-2

**WATERS NOT MEETING DESIGNATED USE BY VARIOUS CAUSE
CATEGORIES IN TENNESSE-BIG SANDY BASIN**

Cause of Not Meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
General Standards (Benthics)	River (mi)	339
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Arsenic	River (mi)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Lead	River (mi)	7
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Mercury	River (mi)	82
	Lakes (acres)	0
	Estuary (sq. mi.)	-
PCB's	River (mi)	64
	Lakes (acres)	0
	Estuary (sq. mi.)	-
pH	River (mi)	0
	Lakes (acres)	314
	Estuary (sq. mi.)	-
Organic Enrichment/Low D.O.	River (mi)	1
	Lakes (acres)	3,541
	Estuary (sq. mi.)	-
Fecal Coliform Pathogen Indicators	River (mi)	386
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Escherichia coli Pathogen Indicators	River (mi)	50
	Lakes (acres)	0
	Estuary (sq. mi.)	-

TABLE 3.2-6-3 WATERS NOT MEETING DESIGNATED USE BY VARIOUS SOURCE CATEGORIES IN TENNESSE-BIG SANDY BASIN

Source of Not meeting Designated use	Type	Total Impaired (Rounded to Nearest Whole Number)
Acid Mine Drainage	River (mi)	36
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Animal Feeding Operations	River (mi)	98
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Atmospheric Deposition – Acidity	River (mi)	9
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Changes in Ordinary Stratification and Bottom Water Hypoxia/Anoxia	River (mi)	0
	Lakes (acres)	3,421
	Estuary (sq. mi.)	-
Contaminated Sediment	River (mi)	9
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Discharges from Municipal Separate Storm Sewer Systems	River (mi)	57
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Grazing in Riparian or Shoreline Zones	River (mi)	2
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Illegal dumps or other Inappropriate Waste Disposal	River (mi)	1
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Impacts from Abandoned Mine Lands	River (mi)	8
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Industrial Point Source Discharge	River (mi)	71
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Livestock Grazing or Feeding Operations	River (mi)	13
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Loss of Riparian Habitat	River (mi)	18
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Mine Tailings	River (mi)	1
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Urbanized High Density Area	River (mi)	167
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Municipal Point Source Discharges	River (mi)	10
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Natural Conditions – Water Quality Use Attainability	River (mi)	0
	Lakes (acres)	120
	Estuary (sq. mi.)	-
On-site Treatment Systems	River (mi)	11
	Lakes (acres)	0
	Estuary (sq. mi.)	-

Source of Not meeting Designated use	Type	Total Impaired (Rounded to Nearest Whole Number)
Residential Districts	River (mi)	21
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Septage Disposal	River (mi)	28
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Source Unknown	River (mi)	265
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Streambank Modification	River (mi)	20
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Surface Mining	River (mi)	91
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Unpermitted Discharge	River (mi)	5
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Upstream Impoundments (PL-566 NRCS Structures)	River (mi)	1
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Wastes from Pets	River (mi)	5
	Lakes (acres)	0
	Estuary (sq. mi.)	-

Chesapeake Bay and Small Coastal Basins

The Chesapeake Bay/Small Coastal Basin is located in the eastern part of Virginia and covers 1,588 square miles or approximately 4 percent of the Commonwealth's total land area. The basin encompasses the small bays, river inlets, islands and shoreline immediately surrounding the Chesapeake Bay and the southern tip of the Delmarva Peninsula. This basin also includes the Chesapeake Bay itself.

The Chesapeake Bay/Coastal Basin is defined by both hydrologic and political boundaries. The Potomac River Basin, the Rappahannock River Basin, the York River Basin, the James River Basin and the Chowan River-Dismal Swamp Basin to its west border the basin. The Atlantic Ocean, on the north borders the Eastern Shore portion on the east by Maryland, and on the west and south by the Chesapeake Bay.

The topography of the Chesapeake Bay/Coastal Basin varies little. The entire basin lies within the Coastal Plain Physiographic Province where elevations average no more than a few feet above sea level. More significant elevation occurs along the central spine of the Eastern Shore portion, which forms a plateau about 45 feet above sea level. Much of the Chesapeake Bay/Coastal Basin is marshland. About 30 percent of the Chesapeake Bay/Coastal Basin is forested, while nearly 21.6 percent is in cropland and pasture. Approximately 24 percent is considered urban.

The 2000 population for the Chesapeake Bay/Coastal Basin was approximately 551,210. All or portions of the following jurisdictions lie within the basin: counties – Accomack, Northampton, Matthews, Northumberland, Lancaster, Middlesex, Gloucester, York, and Nansemond; cities – Portsmouth, Norfolk, Chesapeake, Virginia Beach, Hampton, and Newport News. Tributaries in the Chesapeake Bay/Coastal Basin drain into the Chesapeake Bay or the Atlantic Ocean. Major tributaries flowing into the Chesapeake Bay are the Great Wicomico, Piankatank, Fleets Bay, Mobjack Bay, (East, North, Ware, and Severn Rivers) Poquoson, Back River and Lynnhaven which flow from the mainland. Tributaries in the Eastern Shore portion that drain into the Bay is Pocomoke, Onancock, Pungoteague, Occohannock, and Nassawadox. Machipongo River, Cat Point Creek, Assawoman Creek, Parker Creek, Folly Creek, and Finney Creek drain directly into the Atlantic Ocean.

Citizen-Generated Water Quality Monitoring Data in the Chesapeake Bay and Small Coastal River Basins

The Alliance for the Chesapeake Bay (ACB) coordinates with several affiliate organizations in the Chesapeake Bay and Small Coastal River Basins to monitor a conventional suite of ambient chemical parameters including dissolved oxygen, temperature, pH, salinity and water clarity. ACB also coordinates monitoring at selected sites for a suite of parameters (including nutrients, water clarity, total suspended solids and chlorophyll a) related to submerged aquatic vegetation (SAV). Affiliate organizations these basins include Chesapeake Bay Foundation, York Chapter and the Eastern Shore Soil and Water Conservation District. Trained volunteers monitored 43 stations and conducted 2,400 sampling events in these basins during the five-year data window for this report. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Chesapeake Bay/Coastal Basin is divided into seven USGS hydrologic units as follows: HUC 02060009 – Pocomoke River; HUC 02060010 – Chincoteague Bay; HUC 02080101 – Mainstem open bay; HUC 02080102 – Upper Western Shore Tributaries; HUC 02080108 – Lower Western Shore Tributaries; HUC 02080109 – Tributaries on the Eastern Shore which drain to the Chesapeake Bay; and HUC 2080110 – Tributaries on the Eastern Shore which drain to the Atlantic Ocean. The seven hydrologic units are further divided into 31 waterbodies or watersheds.

Basin assessment information is presented in Table 3.2-7-1, 3.2-7-2, 3.2-7-3.

TABLE 3.2-7-1

CHESAPEAKE BAY-SMALL COASTAL BASIN INDIVIDUAL USE SUPPORT SUMMARY TABLE

Basin Size: All Sizes Rounded to Nearest Whole Number

Rivers - 987 miles

Lakes - 2,358 acres

Estuaries - 1,888 sq. miles

Designated Use	Water Body Type	Fully Supporting	Total Impaired	Naturally Impaired	Insufficient Information	Not Assessed	Total Assessed
Aquatic Life	River (mi)	21	79	31	0	887	100
	Lakes (acres)	304	431	0	0	1,623	735
	Estuary (sq. mi.)	244	1,379	0	27	239	1,623
Fishing	River (mi)	7	7	0	0	974	14
	Lakes (acres)	485	0	0	0	1873	485
	Estuary (sq. mi.)	1,041	2	0	0	846	1,043
Shellfishing	River (mi)	-	-	-	-	-	-
	Lakes (acres)	-	-	-	-	-	-
	Estuary (sq. mi.)	1,855	29	0	0	0	1,884
Swimming	River (mi)	48	45	0	2	893	93
	Lakes (acres)	686	0	0	0	1,672	686
	Estuary (sq. mi.)	57	4	0	1	1,827	61
Public Water Supply	River (mi)	2	0	0	0	0	2
	Lakes (acres)	1,558	0	0	0	0	1,558
	Estuary (sq. mi.)	-	-	-	-	-	-
Wildlife	River (mi)	90	4	0	0	893	94
	Lakes (acres)	386	300	0	0	1,672	686
	Estuary (sq. mi.)	66	0	0	1	1,821	66

TABLE 3.2-7-2

**WATERS NOT MEETING DESIGNATED USE BY VARIOUS CAUSE
CATEGORIES IN CHESAPEAKE BAY – SMALL COASTAL BASIN**

Cause of Not Meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
General Standards (Benthics)	River (mi)	19
	Lakes (acres)	0
	Estuary (sq. mi.)	391
Chloride	River (mi)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Copper	River (mi)	1
	Lakes (acres)	300
	Estuary (sq. mi.)	0
Nitrates	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	96
Mercury	River (mi)	7
	Lakes (acres)	0
	Estuary (sq. mi.)	2
pH	River (mi)	33
	Lakes (acres)	57
	Estuary (sq. mi.)	0
PCB's	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Phosphate	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	96
Organic Enrichment/Low D.O.	River (mi)	46
	Lakes (acres)	374
	Estuary (sq. mi.)	1,107
Fecal Coliform Pathogen Indicators	River (mi)	45
	Lakes (acres)	0
	Estuary (sq. mi.)	30
Escherichia coli Pathogen Indicators	River (mi)	2
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Enterococcus Pathogen Indicators	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	0

TABLE 3.2-7-3

**WATERS NOT MEETING DESIGNATED USE BY VARIOUS SOURCE
CATEGORIES IN CHESAPEAKE BAY – SMALL COASTAL BASIN**

Source of Not meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
Atmospheric Deposition – Nitrogen	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	1089
Changes in Ordinary Stratification and Bottom Water Hypoxia/Anoxia	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	15
Discharge from Municipal Separate Storm Sewer Systems	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	6
Industrial Point Sources	River (mi)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	1089
Leaking Underground Storage Tanks	River (mi)	2
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Urbanized High Density Area	River (mi)	0
	Lakes (acres)	300
	Estuary (sq. mi.)	6
Municipal Point Source Discharges	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	1089
Natural Conditions – Water Quality Use Attainability	River (mi)	31
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Natural Sources	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	6
Non-Point Sources	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	1095
On-site treatment Systems	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	6
Source Unknown	River (mi)	68
	Lakes (acres)	431
	Estuary (sq. mi.)	25
Sources Outside State Jurisdiction or Borders	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	1089

York River Basin

The York River Basin lies in the central and eastern section of Virginia and covers 2,662 square miles or 7 percent of the Commonwealth's total area. It is defined by hydrologic boundaries. The Rappahannock River Basin bound the basin to the north and east and the James River Basin to the south and west.

The headwaters of the York River begin in Orange County and flow in a southeasterly direction for approximately 220 miles to its mouth at the Chesapeake Bay. The basin's width varies from five miles at the mouth to 40 miles at its headwaters.

The basin is comprised of the York River and its two major tributaries, the Pamunkey and the Mattaponi. The York River itself is only about 30 miles in length. The Pamunkey River's major tributaries are the North and South Anna Rivers and Little River, while the major Mattaponi tributaries are the Matta, the Po and Ni Rivers.

Lying in the Piedmont and Coastal Plain physiographic provinces, the basin's topography is characterized by slightly rolling hills at the headwaters or extreme western portion, to gently sloping hills and flat farmland near its mouth. Tributaries in the central Piedmont exhibit moderate and near constant profiles. Their flat slope largely characterizes streams in the Coastal Plain. Approximately 65 percent of the land area is forest. Farmland and pasture accounts for approximately 20 percent of the land area while approximately 10 percent of the river basin land area is urban.

The 2000 population for the York River Basin was approximately 203,159. The majority of the population is rural, evenly distributed throughout the basin. No major cities lie within the basin. All or portions of the following twelve counties lie within the basin: Caroline, Goochland, Hanover, Louisa, Orange, Spotsylvania, Gloucester, James City, King and Queen, King William, New Kent and York.

Citizen-Generated Water Quality Monitoring Data in the York River Basin

The York River Basin has a number of active citizen monitoring organizations collecting and analyzing both ambient and benthic macroinvertebrate data. The organizations described in this section submitted data where one or more parameters were collected using documented protocols, standard operating procedures, and quality assurance/quality control procedures approved by the Department of Environmental Quality (DEQ) for water quality assessment purposes.

The Alliance for the Chesapeake Bay (ACB) coordinates with several affiliate organizations in the York River Basin to monitor a conventional suite of ambient parameters including dissolved oxygen, temperature, pH, salinity and water clarity. ACB also coordinates monitoring at selected sites for a suite of parameters (including nutrients, water clarity, total suspended solids and chlorophyll *a*) related to submerged aquatic vegetation (SAV). Affiliate organizations in this basin include the York Chapter of the Chesapeake Bay Foundation, Mattaponi Indian Reservation, and York River State Park. Trained volunteers monitored 21 stations and conducted 1,679 sampling events in the York River Basin during the five-year data window for this report. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Historic Green Springs, Inc. conducted monitoring in the York River Basin for temperature, pH, nutrients, and total suspended solids. Trained volunteers monitored 5 stations and conducted 22 sampling events in this basin during the data window for this assessment. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Lake Anna Civic Association conducted monitoring on Lake Anna and its tributaries for a conventional suite of ambient parameters including dissolved oxygen, temperature, pH, fecal coliform bacteria, total phosphorus and water clarity. Trained volunteers monitored 20 stations and conducted 111 sampling events in this basin during the data window for this report. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Mattaponi and Pamunkey Rivers Association monitored throughout the entire York River Basin for temperature, pH, nutrients, and total suspended solids. Trained volunteers monitored 36 stations and conducted 236 sampling events in this basin during the data window for this assessment. The data for these sites were used in this assessment to indicate areas needing follow-up monitoring.

The Virginia Save Our Streams Program of the Virginia Division of the Izaak Walton League of America (VA SOS) coordinates efforts in the York River Basin to monitor benthic macroinvertebrates. Certified VA SOS volunteers sampled 2 stations during 3 sampling events for benthic macroinvertebrates. These data were used in this assessment to indicate areas needing follow-up monitoring.

The York River Basin is divided into three USGS hydrologic units as follows: HUC 02080102 – York River Subbasin, HUC 02080105 – Mattaponi River Subbasin; HUC 02080106 and Pamunkey River Subbasin. The three hydrologic units are further divided into 23 waterbodies or watersheds.

Basin assessment information is presented in Table 3.2-8-1, 3.2-8-2, 3.2-8-3.

TABLE 3.2-8-1

YORK RIVER BASIN INDIVIDUAL USE SUPPORT SUMMARY TABLE

Basin Size: All Sizes Rounded to Nearest Whole Number

Rivers - 3,419 miles

Lakes - 11,130 acres

Estuaries - 91 sq. miles

Designated Use	Water Body Type	Fully Supporting	Total Impaired	Naturally Impaired	Insufficient Information	Not Assessed	Total Assessed
Aquatic Life	River (mi)	254	192	135	58	2,915	446
	Lakes (acres)	5,764	0	0	4,403	962	5,764
	Estuary (sq. mi.)	0	70	0	1	20	70
Fishing	River (mi)	119	5	0	0	3,295	124
	Lakes (acres)	829	2,512	0	0	7,789	3,341
	Estuary (sq. mi.)	47	0	0	0	44	47
Shellfishing	River (mi)	-	-	-	-	-	-
	Lakes (acres)	-	-	-	-	-	-
	Estuary (sq. mi.)	50	10	0	0	0	60
Swimming	River (mi)	168	191	0	10	3,049	359
	Lakes (acres)	5,284	0	0	4,263	1,583	5,284
	Estuary (sq. mi.)	70	1	0	0	20	71
Public Water Supply	River (mi)	22	0	0	0	194	22
	Lakes (acres)	315	0	0	0	449	315
	Estuary (sq. mi.)	-	-	-	-	-	-
Wildlife	River (mi)	370	0	0	0	3,049	370
	Lakes (acres)	5,284	0	0	0	5,846	5,284
	Estuary (sq. mi.)	61	8	8	0	22	69

TABLE 3.2-8-2

**WATERS NOT MEETING DESIGNATED USE BY VARIOUS CAUSE
CATEGORIES IN YORK BASIN**

Cause of Not Meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
General Standards (Benthics)	River (mi)	1
	Lakes (acres)	0
	Estuary (sq. mi.)	54
Bentho(k)fluoranthene	River (mi)	5
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Chloride	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	8
PCB's	River (mi)	0
	Lakes (acres)	2,512
	Estuary (sq. mi.)	0
pH	River (mi)	142
	Lakes (acres)	0
	Estuary (sq. mi.)	2
Organic Enrichment/Low D.O.	River (mi)	50
	Lakes (acres)	0
	Estuary (sq. mi.)	21
Fecal Coliform Pathogen Indicators	River (mi)	191
	Lakes (acres)	0
	Estuary (sq. mi.)	11
Nutrient/Eutrophication Biological Indicators	River (mi)	0
	Lakes (acres)	0
	Estuary (sq. mi.)	59

TABLE 3.2-8-3 WATERS NOT MEETING DESIGNATED USE BY VARIOUS SOURCE CATEGORIES IN YORK BASIN

Source of Not meeting Designated use	Type	Total Impaired (Rounded to Nearest Whole Number)
Impacts from Abandoned Mine Lands	River (mi)	5
	Lakes (acres)	0
	Estuary (sq. mi.)	0
Natural Conditions – Water Quality Use Attainability	River (mi)	135
	Lakes (acres)	0
	Estuary (sq. mi.)	21
Source Unknown	River (mi)	213
	Lakes (acres)	2,512
	Estuary (sq. mi.)	73

New River Basin

The New River Basin is located in southwest Virginia and covers 3,070 square miles or approximately 8 percent of the Commonwealth's total land area. The New River flows from its headwaters in Watauga County, North Carolina in a northeasterly direction to Radford, Virginia, and then in a northwesterly direction to Glen Lyn, where it exits into West Virginia. There it flows to the confluence of the Gauley River forming the Kanawha River, a tributary to the Ohio River.

The New River Basin in Virginia is defined by both hydrologic and political boundaries. It is bordered by the James River Basin and Roanoke River Basin to the east, and the Big Sandy River Basin and Tennessee River Basin to the west. The southern boundary of the Virginia portion is the North Carolina State line and its northwest boundary is the West Virginia State line.

The New River Basin runs 115 miles in length from Blowing Rock, North Carolina to Bluestone Dam near Hinton, West Virginia with a maximum basin width of 70 miles near Rural Retreat, Virginia. The Virginia portion of the New River Basin is 87 miles in length.

The topography of the New River Basin is generally rugged, the upper reaches of its tributaries being extremely steep. High mountains, narrow valleys and steep ravines characterize the basin. There are ten tributaries in the Upper New River Basin each having more than 100 square miles in drainage area and many others with forty or more square miles.

The New River Basin is the least densely populated of the Commonwealth's major river basins. The higher elevations of the basin have steep slopes and are thickly forested, while the mount bases are mostly used for agriculture. Approximately 59 percent of its land is forested. Cropland and pasture make up another 35 percent, with approximately 3 percent considered urban.

The 2000 population for the New River Basin was approximately 240,564. All or portions of the following 11 counties lie within the basin: Grayson, Carroll, Smyth, Wythe, Pulaski, Floyd, Montgomery, Tazewell, Bland, Giles, and Craig and the cities of Galax and Radford.

Citizen Data in the New River Basin

The Virginia Save Our Streams Program of the Virginia Division of the Izaak Walton League of America (VA SOS) coordinates with a number of affiliate organizations in the New River Basin to monitor benthic macroinvertebrates. Affiliate organizations in this basin include Bluestone Watershed Committee, Elliott Creek Watershed Protection Council, Radford University Green Team, Virginia Museum of Natural History at Virginia Tech, Virginia Tech Student Chapter of the American Water Resources Association, and the Walker Creek Watershed Group. Certified VA SOS volunteers sampled 29 stations during 100 sampling events for benthic macroinvertebrates. These data were used in this assessment to indicate areas needing follow-up monitoring.

The New River Basin is divided into two USGS hydrologic units as follows: HUC 05050001 – Upper New; and HUC 05050002 – Middle New. The two hydrologic units are further divided into 35 waterbodies or watersheds.

Basin assessment information is presented in Table 3.2-9-1, 3.2-9-2, 3.2-9-3.

TABLE 3.2-9-1

NEW RIVER BASIN INDIVIDUAL USE SUPPORT SUMMARY TABLE

Basin Size: All Sizes Rounded to Nearest Whole Number

Rivers - 4,129 miles

Lakes - 5,252 acres

Estuaries - 0 sq. miles

Designated Use	Water Body Type	Fully Supporting	Total Impaired	Naturally Impaired	Insufficient Information	Not Assessed	Total Assessed
Aquatic Life	River (mi)	661	98	11	32	3,351	759
	Lakes (acres)	78	4,463	2,654	0	711	4,541
	Estuary (sq. mi.)	-	-	-	-	-	-
Fishing	River (mi)	118	72	0	0	3,938	190
	Lakes (acres)	4,140	323	0	0	789	4,463
	Estuary (sq. mi.)	-	-	-	-	-	-
Shellfishing	River (mi)	-	-	-	-	-	-
	Lakes (acres)	-	-	-	-	-	-
	Estuary (sq. mi.)	-	-	-	-	-	-
Swimming	River (mi)	247	337	0	46	3,499	584
	Lakes (acres)	4,463	0	0	0	789	4,463
	Estuary (sq. mi.)	-	-	-	-	-	-
Public Water Supply	River (mi)	26	0	0	0	301	26
	Lakes (acres)	1,916	0	0	0	225	1,916
	Estuary (sq. mi.)	-	-	-	-	-	-
Wildlife	River (mi)	643	0	0	14	3,471	643
	Lakes (acres)	4,463	0	0	0	789	4,463
	Estuary (sq. mi.)	-	-	-	-	-	-

TABLE 3.2-9-2

**WATERS NOT MEETING DESIGNATED USE BY VARIOUS CAUSE
CATEGORIES IN NEW BASIN**

Cause of Not Meeting Designated Use	Type	Total Impaired (Rounded to Nearest Whole Number)
General Standards (Benthics)	River (mi)	78
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Chlordane	River (mi)	1
	Lakes (acres)	0
	Estuary (sq. mi.)	-
DDE	River (mi)	10
	Lakes (acres)	0
	Estuary (sq. mi.)	-
DDT	River (mi)	10
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Mercury	River (mi)	2
	Lakes (acres)	0
	Estuary (sq. mi.)	-
pH	River (mi)	0
	Lakes (acres)	1,809
	Estuary (sq. mi.)	-
PCB's	River (mi)	70
	Lakes (acres)	323
	Estuary (sq. mi.)	-
Organic Enrichment/Low D.O.	River (mi)	3
	Lakes (acres)	4,463
	Estuary (sq. mi.)	-
Temperature	River (mi)	20
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Fecal Coliform Pathogen Indicators	River (mi)	337
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Escherichia coli Pathogen indicators	River (mi)	31
	Lakes (acres)	0
	Estuary (sq. mi.)	-

**TABLE 3.2-9-3 WATERS NOT MEETING DESIGNATED USE BY VARIOUS SOURCE
CATEGORIES IN NEW BASIN**

Source of Not meeting Designated use	Type	Total Impaired (Rounded to Nearest Whole Number)
Agriculture	River (mi)	86
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Animal Feeding Operations	River (mi)	21
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Discharge from Municipal Separate Storm Sewer Systems	River (mi)	30
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Impacts from Abandoned Mine lands	River (mi)	9
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Livestock Grazing or Feeding Operations	River (mi)	25
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Loss of Riparian Habitat	River (mi)	49
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Urbanized High Density Area	River (mi)	34
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Municipal Point Source Discharges	River (mi)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Natural Conditions – Water Quality Use Attainability	River (mi)	11
	Lakes (acres)	4,463
	Estuary (sq. mi.)	-
Non-Point Source	River (mi)	122
	Lakes (acres)	0
	Estuary (sq. mi.)	-
On-site Treatment Systems	River (mi)	64
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Release from Waste Sites or Dumps	River (mi)	4
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Sanitary Sewer Overflows	River (mi)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Septage Disposal	River (mi)	3
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Source Unknown	River (mi)	183
	Lakes (acres)	2,133
	Estuary (sq. mi.)	-
Wet Weather Discharges	River (mi)	16
	Lakes (acres)	0
	Estuary (sq. mi.)	-
Wildlife other than Waterfowl	River (mi)	97
	Lakes (acres)	0
	Estuary (sq. mi.)	-